



Longshore currents and rip currents: Modelization towards an operative forecast.

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Effects of longshore currents induced by waves have been studied since the 1960s from the works of Longuet-Higgins and Stewart. Many researches on coastal morphology and bathymetry were published after the Radiation Stress formulation, most of them with a highly empirical basis. But currents at the beach are themselves a very important issue for beach users, becoming critical in the case of Navy amphibious operations or rip currents for beachgoers.

Fluid dynamics of waves at the shore are not restricted to the wellknown open-sea processes of energy generation-propagation-dissipation. Several terms have to be considered in the momentum balance, such as turbulence, depth induced breaking and the mentioned radiation stress. Wave models -WAM, WW3 and SWAN- need to be then implemented with a hydrodynamical focus. This is achieved with specific models that employ wave spectra at their boundaries and are forced with sea level values. These models make use of an explicit discretization, i.e. to keep them stable it is required to accomplish CFL condition. So a high spatial resolution for a better depicting of all processes implies a small time step and therefore a high computational cost. Besides longshore currents, other breaking wave parameters have to be forecasted, such as breaking wave height, width of breaking area, type of breaking or breaking angle.

AEMET is testing the Deltares XBeach model on several locations with different wave characterization. Delft3D, SWASH or FunWAVE are codes that can also be usefull for our purposes. Accuracy and time of execution are key values for deciding which model and implementation will be choosed for beach forecasting.